

TERRASCEND NJ

BOONTON FACILITY

**ODOR CORRECTIVE
ACTION AND
MITIGATION PLAN**

February 2021

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Introduction

About TerrAscend

- ▶ Provides quality products, brands, and services to the global cannabinoid market.
- ▶ The first North American Operator (NAO), with scale operations in both Canada and the US, TerrAscend participates in the medical and legal adult use market across Canada and in several US states where cannabis has been legalized for therapeutic or adult use.
- ▶ TerrAscend was the first cannabis company with sales in the US, Canada, and Europe.
- ▶ TerrAscend is currently authorized to cultivate and process medical cannabis in the State of New Jersey and has one alternative treatment center (ATC) operational in Philipsburg with two additional ATCs coming online in 2021.

Medical Cannabis in New Jersey

- ▶ **Medical Cannabis Shortage in New Jersey.** The Department of Health (DOH) reports that since March 2018, when the expansion of conditions available for medical cannabis treatment was announced, the patient population has significantly expanded. Alternative Treatment Centers (ATCs) experience product shortages.
- ▶ **Expansion of Patient Access.** Passage of the Jake Honig Compassionate Use Medical Cannabis Act in 2019 significantly expanded patient access. The bill raises the limit from two to three ounces (until the maximum amount is determined by regulation), authorizes edibles for adult patients in addition to patients who are minors, increases the authorization period from a 90-day supply to a one-year supply, and eliminates the limit for terminally ill patients.
- ▶ **The Importance of Growing/Processing Medical Cannabis.** DOH reports that the ATC prices can be higher than prices on the illegal market for roughly half the patient population. DOH concludes high prices artificially suppress demand and the best way to reduce prices is to expand supply and increase competition and choice for patients. DOH states that “lowering prices should be an explicit goal of the Division of Medicinal Marijuana.”

New Jersey Department of Health, Division of Medicinal Marijuana, Biennial Report (April 1, 2019), available at <https://nj.gov/health/medicalmarijuana>

Governor Murphy Signs Legislation to Dramatically Reform New Jersey's Medical Marijuana Program, Expand Patient Access (July 2, 2019), available at <https://www.nj.gov/governor/news/news/562019/approved/20190702d.shtml>

Background

▶ The Boonton Facility

- ▶ The Boonton Facility is located at 130 Old Denville Road in Boonton Township, Morris County.
- ▶ TerrAscend NJ cultivates and harvests medical cannabis at the facility. Operations began in Summer 2020.
- ▶ Developed with one indoor cultivation facility and a greenhouse cultivation facility.

▶ The Greenhouse


- ▶ Approximately twenty-four thousand (24,000) square feet.
- ▶ Historically used to grow conventional ornamental plants.
- ▶ One (1) large bay for propagation, mother-stock, and vegetative plant growth.
- ▶ Nine (9) bays for flowering plant growth.
- ▶ Given the age and structure of the Greenhouse, the odor management systems that are integral to the heating, ventilation, and air conditioning systems in modern indoor cultivation facilities are not available.

Boonton Facility Plans

TerrAscend plans to construct another modern indoor cultivation facility as soon as feasible.



As part of this plan, the Greenhouse cultivation operations will be discontinued once the new cultivation facility is operational.



At that point, all cultivation operations at the Boonton Facility will occur in modern indoor cultivation buildings with highly efficient odor mitigation systems integrated into the heating, ventilation, and air conditioning systems.

Odor in the Cannabis Industry

- ▶ Cannabis-characteristic odors are attributable to the volatile organic compounds (VOCs) of the cannabis plant.
- ▶ The characteristic smell of the cannabis plant is caused by terpenes.
- ▶ Terpenes are biogenic VOCs produced during the growth and reproduction cycles.
- ▶ Terpenes are found in nearly every plant; terpenes give us the scents of oranges, lavender, and chamomile.
- ▶ As the emerging cannabis industry grew across the United States and Canada, it developed cannabis odor mitigation best practices. Many of these practices are incorporated at cultivation facilities across the country.

Best Management Practices for Greenhouses

- ▶ A company that operates greenhouses for cannabis cultivation researched odor mitigation technologies across many industries.
- ▶ The resulting report concluded that carbon filtration within a greenhouse is generally accepted as an industry standard.
- ▶ The report also found that other technologies, such as waterless vapor phase systems, can be used as a secondary system to manage fugitive odors around the vicinity of the greenhouse.
- ▶ The research supported a multi-faceted approach for odor mitigation systems.
 - ▶ Reducing venting frequency by optimizing the growing conditions through good agricultural practices and dehumidification.
 - ▶ Using carbon filtration within the growing space to remove odor from the ambient air in proximity to the vents.
 - ▶ Operating a waterless vapor phase system to neutralize fugitive odors.

Boonton Facility Odor Studies

- ▶ In the summer of 2020, TerrAscend hired Bosarge Environmental (“Bosarge”) to perform an Odor Assessment of the Boonton Facility.
- ▶ Bosarge is operated by Melanie Bosarge, a chemical engineer with nearly 20 years experience in odor assessment and mitigation.
- ▶ An Odor Assessment records the location, date, and time of testing, olfactory meter readings, and meteorological conditions such as temperature, humidity, precipitation, sky conditions, wind speed, and wind direction. These are key metrics for a reliable odor mitigation survey.

Boonton Facility Odor Studies

Baseline Assessment

- ▶ Baseline Assessment was performed July 27-28, 2020, after TerrAscend planted its first crop.
- ▶ Bosarge developed a precautionary odor mitigation and assessment strategy.
- ▶ Several locations within and outside the property boundaries of the Boonton Facility were designated as odor reading locations.
- ▶ These locations were entered into odor tracking software to help provide consistent evaluation metrics for future evaluations.
- ▶ Olfactometer readings were taken at the designated locations several times per day.
- ▶ **RESULT: No odors were detected onsite or beyond the perimeter of the Boonton Facility.**

Boonton Facility Odor Studies

Intermediate Assessment

- ▶ Intermediate Assessment was performed on October 20-22, 2020.
- ▶ These dates were selected because they presented worst-case conditions:
 - ▶ The Greenhouse was in full flowering stage and freshly harvested cannabis crops were in the drying stage (these stages are associated with high levels of terpenes); and
 - ▶ Meteorological conditions included high humidity, heavy fog, and variable wind (each of which are associated with exacerbating odor conditions).
- ▶ Additional testing locations were identified and added to the odor tracking software.
- ▶ In total, forty-four (44) odor survey locations in and around the Boonton Facility were identified. Locations are depicted in the following slides.
- ▶ **RESULT:** More than four hundred (400) readings were taken at the 44 survey locations. No discernable cannabis odors were detected beyond the perimeter of the Boonton Facility.

Odor Survey Locations

Loc #	Name
3	122 Denville Rd @ Garage
8	122 Denville Rd @ Right Comer Perimeter
9	Right Back Perimeter
10	Back Rd e Curve
11	Back Rd Gate to Boonton Water Supply
12	Back Rd 0 Edge of GH3
13	Back Rd 0 Middle of GH3
14	Back Rd @ Far End of GH3
15	Corner Perimeter Next to Park
16	Side Rd @ Back of GH3
17	Side Rd @ Doorway of G/13 Section 20
18	Side Rd @ Front of GH3
19	Side Rd @ Blue No Trespass Sign
20	Front Perimeter e Middle of GH3
21	Front Perimeter e Edge of W1.13
22	Left Front Corner of GH2
23	Midpoint of GH2 @ Door
24	Back Corner of GH2
25	Back Side Center of GH2
26	Back End of Fans
27	Prop Line Gate L Rd
28	Prop Line LP 50
29	LP 49

Loc #	Name
33	Gate from Office to GH2
34	Mid Roadway from Office
35	Mid Bldg by Door
36	Front W112 at Res Fence
37	122 Driveway Mid House
A	Pleasant valley @ Farmstead
B	Pleasant valley @ Harcourt Terrace
C	Pleasant valley @ Bush Road
D	Pleasant valley @ Curve & Post 421
E	Pleasant Valley @ Culdesac
F	Denville e Stull Road
G	Toume County Park Drive @ Denville
H	Toume County Park @ Denville Rd
I	139 Old Denville
J	Pondhill @ Denville Rd
K	Pondhill @ Gray House
L	Pondhill @ Red Bldg
M	Pondhill End @ Culdesac
N	122 Old Denville Rd @ Entrance
O	Entrance @130 Denville
P	Residence 132 e Entrance Road

Figure No. 2 - Odor Inspection Locations Full View identifies each of the forty-four (44) monitoring locations on a Google Earth map.

Figure No. 2 - Odor Inspection Locations Full View

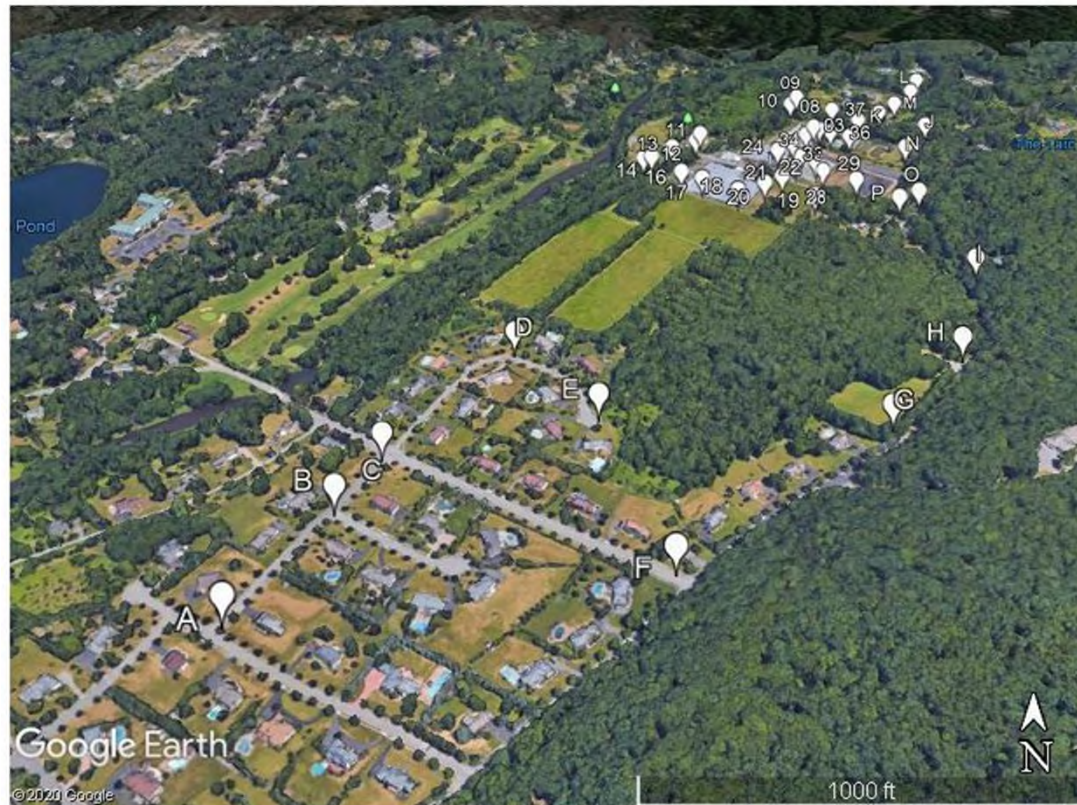


Figure No. 3 - Odor Inspection Locations Close-up of Facility identifies the monitoring locations in the vicinity of the facility on a Google Earth map.

Figure No. 3 - Odor Inspection Locations Close-up of Facility



Boonton Facility Odor Studies

► Area Odor Sources

- October 21, 2020, Bosarge detected a slight, intermittent and variable odor at the northeast boundary of the Boonton Facility, however, the odor was not the characteristic odor of cannabis.
- In response to reports from neighbors in the evening of October 21, 2020, additional readings were taken but still no cannabis-characteristic odors were detected.
- In the morning of October 22, 2020, public works were mending a sewer leak in the immediate vicinity of the Boonton Facility.
- Bosarge suggests the odors reported by residents on the evening of October 21 could have been related to this sewer leak.
- Also, the power company had been installing electrical conduit poles in the area, and the source of odors reported by residents may have been drilled mud or dirt.
- The Intermediate Assessment Olfactometer readings identified the intermittent presence of a barely discernible odor at the perimeter of the Boonton Facility, but not the odor characteristic of cannabis operations.

Odor Complaints and NJDEP Actions

- ▶ November 10, 2020. Morris County Health Department investigates a resident's odor complaint and alleges the Boonton Facility operations were the source of the odor.
- ▶ November 13, 2020. NJDEP alleges odors from the growing of marijuana plants at the Boonton Facility were emitted into the outdoor atmosphere in quantities which resulted in air pollution.
- ▶ November 19, 2020. Morris County Health Department investigates a resident's odor complaint and alleges the Boonton Facility operations were the source of the odor.
- ▶ November 24, 2020. NJDEP issues Administrative Order and Notice of Civil Administrative Penalty (AONOCAPA), EA ID #: PEA200002-27165.
- ▶ December 3, 2020. NJDEP issues AONOCAPA EA ID #: PEA200003-27165.
- ▶ NJDEP reports it received 146 odor complaints relating to the area of the Boonton Facility.
- ▶ TerrAscend is participating in the NJDEP Alternative Dispute Resolution program to address the two AONOCAPAs.

July 27-28, 2020	Bosarge conducts a Baseline Assessment.
Aug. 2020	The Fogco system is installed and operational.
Sept. 2020	TerrAscend begins to test and assess the Benzaco Scientific odor neutralizing solution under various conditions.
Oct. 20-22, 2020	Bosarge returns to conduct its Intermediate Assessment Odor Survey; more than 400 olfactory meter readings are recording in and around the Facility.
Nov. 2020	In response to community calls for odor mitigation, TerrAscend evaluates industry best practices, orders activated charcoal systems to filter air entering exhaust ports and “Can Fans” to filter air throughout the Greenhouse and develops the exhaust stack prototype.
Dec. 7, 2020	TerrAscend submits the exhaust fan system for approval from the Boonton Township Construction Department.
Jan. 2021	TerrAscend installed the ten (10) “Can Fans” now operating throughout the Greenhouse.
Feb./Mar. 2021	Estimated date to complete installation of the exhaust stacks (subject to weather conditions). Conduct third Odor Survey after exhaust stacks are operational.

Timeline

Odor Mitigation System

Multi-Tiered Treatment System

Ongoing Monitoring & Assessment

Public Outreach & Response

Multi-Tiered Treatment System

Primary Tier: Can Fans

Secondary Tier: Activated Carbon Filters

Tertiary Tier: Odor Neutralizer

Quaternary Tier: Exhaust Stacks

Primary Tier: Can Fans

- ▶ The primary level of the filtration system consists of ten (10) Can Fans placed around the Greenhouse, which utilize activated carbon filters.
 - ▶ Activated carbon is an adsorbent for VOCs, meaning that the compounds adhere to the surface of the non-toxic charcoal.
- ▶ Captures biogenic VOCs in the ambient air inside the Greenhouse.
- ▶ Can Fans that utilize activated carbon filters are generally considered a best odor management practice within the cannabis industry.
- ▶ Each fan cycles two thousand, nine hundred and five cubic feet of air per minute (2,905 CFM).
- ▶ Total output for the ten (10) Can Fans is 29,050 CFM.
- ▶ TerrAscend developed internal procedures to maintain a durable supply of filters and to replace them consistently.

Secondary Tier: Activated Carbon Filters

- ▶ Activated charcoal filters are installed on the interior of each of the thirty-six (36) Greenhouse exhaust ports.
- ▶ As the exhaust port fans draw the air out of the Greenhouse, it passes through the filters, trapping VOCs in the porous activated charcoal.
- ▶ TerrAscend developed internal procedures to maintain a durable supply of filters and to replace them consistently.

Tertiary Tier: Odor Neutralizer

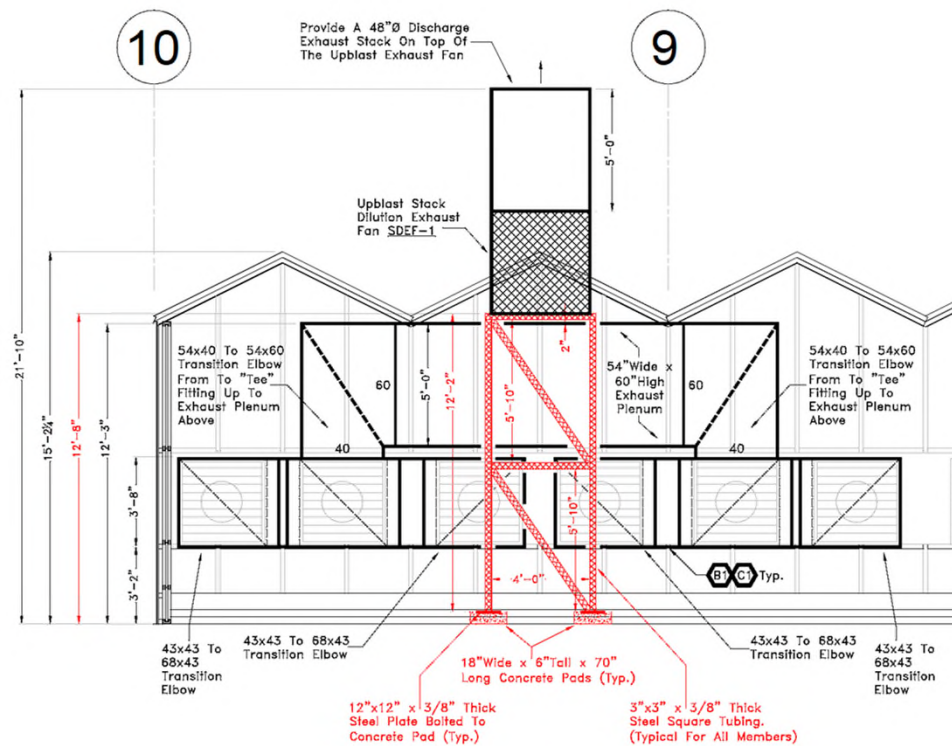


- ▶ Best odor management practices have found that treatment of exhausted air is effective to mitigate VOC odors that may have bypassed interior filtration systems.
- ▶ TerrAscend uses a high-pressure odor-neutralizing solution system to treat exhausted air.
- ▶ In August of 2020, TerrAscend installed a Fogco system. Fogco systems have been used since 1989 to mitigate odors produced by landfills, water and solid waste treatment facilities, and chemical processing plants.
- ▶ The Fogco system “rings” introduce a mist of an odor neutralizing solution at the exterior of the Greenhouse exhaust ports (see photo).
- ▶ TerrAscend used an odor neutralizing solution from Benzaco Scientific designed specifically to breakdown VOCs produced by the cannabis plant.
- ▶ TerrAscend is procuring and implementing the use of the odor neutralizing solution produced by Byers.
- ▶ TerrAscend will continue to monitor the performance and dial the system in, considering growth and production cycles and meteorological conditions.

Quaternary Tier: Exhaust Stacks

- ▶ TerrAscend developed plans for a ventilation stack system to add another layer of mitigation.
- ▶ A prototype stack was installed to test the concept (see photo).
- ▶ Plans were submitted to Boonton Township Construction Department on December 7, 2020, which have been approved.
- ▶ The exhaust stacks will be equipped with fans that will propel the ventilated air using high velocity to significantly increase the height of discharge into the atmosphere and introduce more air volume to the exhausted air.
- ▶ Excerpts of the engineering plans are provided in the following slides. The full engineering plans are too large to include on one slide; copies can be provided upon request.
- ▶ *Note that the exhaust stacks to be installed will be smaller than the prototype.*





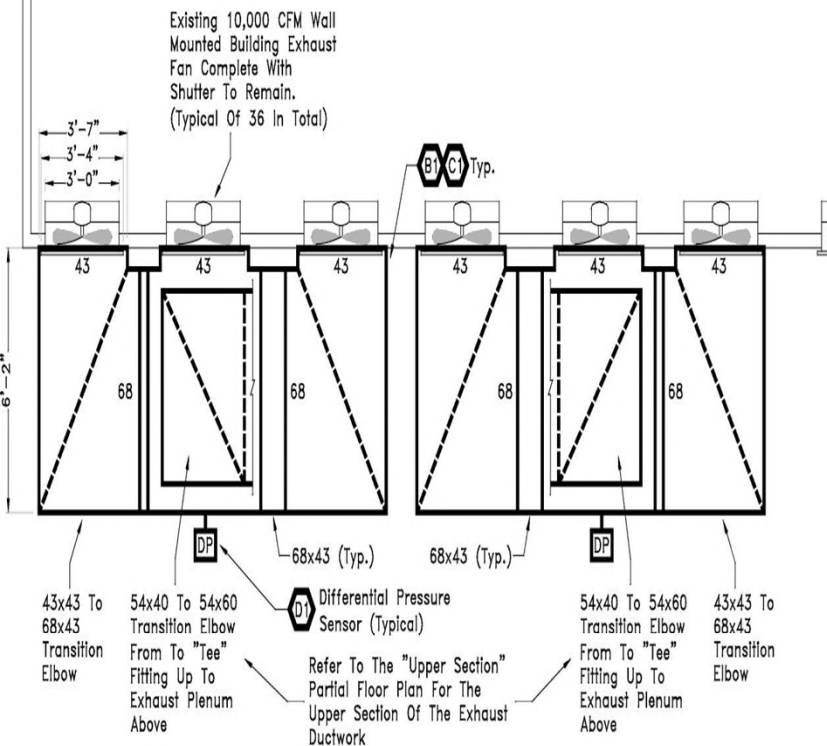
NOTE: For Ease In Reading The Drawing, The Dimensions Indicated In This Elevation Match The Duct Sizes Shown On The Floor Plan.

3
MI

PARTIAL GREENHOUSE - NORTH ELEVATION

SCALE: 1/4" = 1'-0"

TYPICAL FOR (6) LOCATIONS

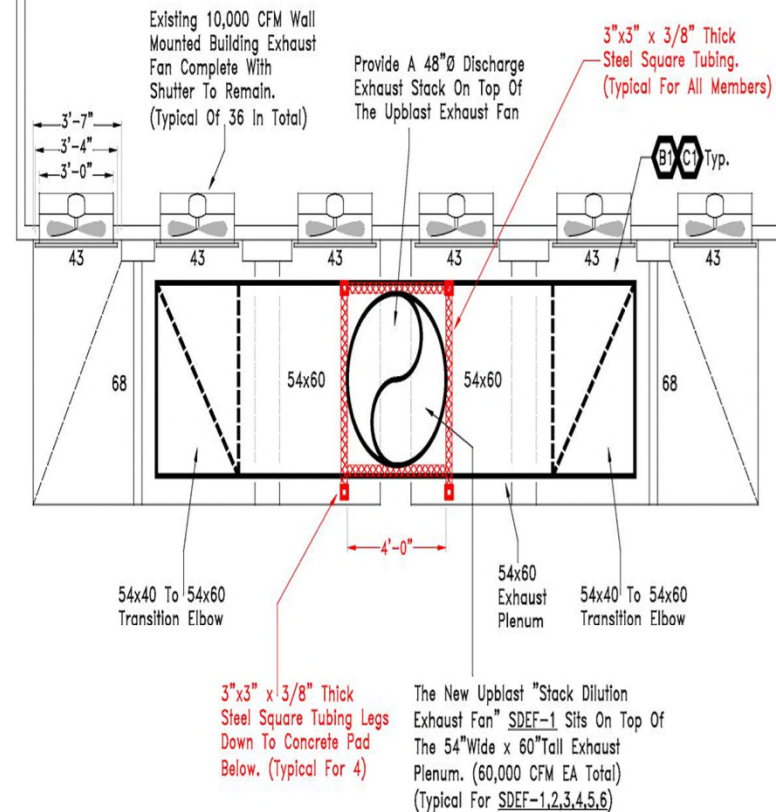


2A
MI

PARTIAL FLOOR PLAN (Lower Section)

SCALE: 1/4" = 1'-0"

TYPICAL FOR (6) LOCATIONS

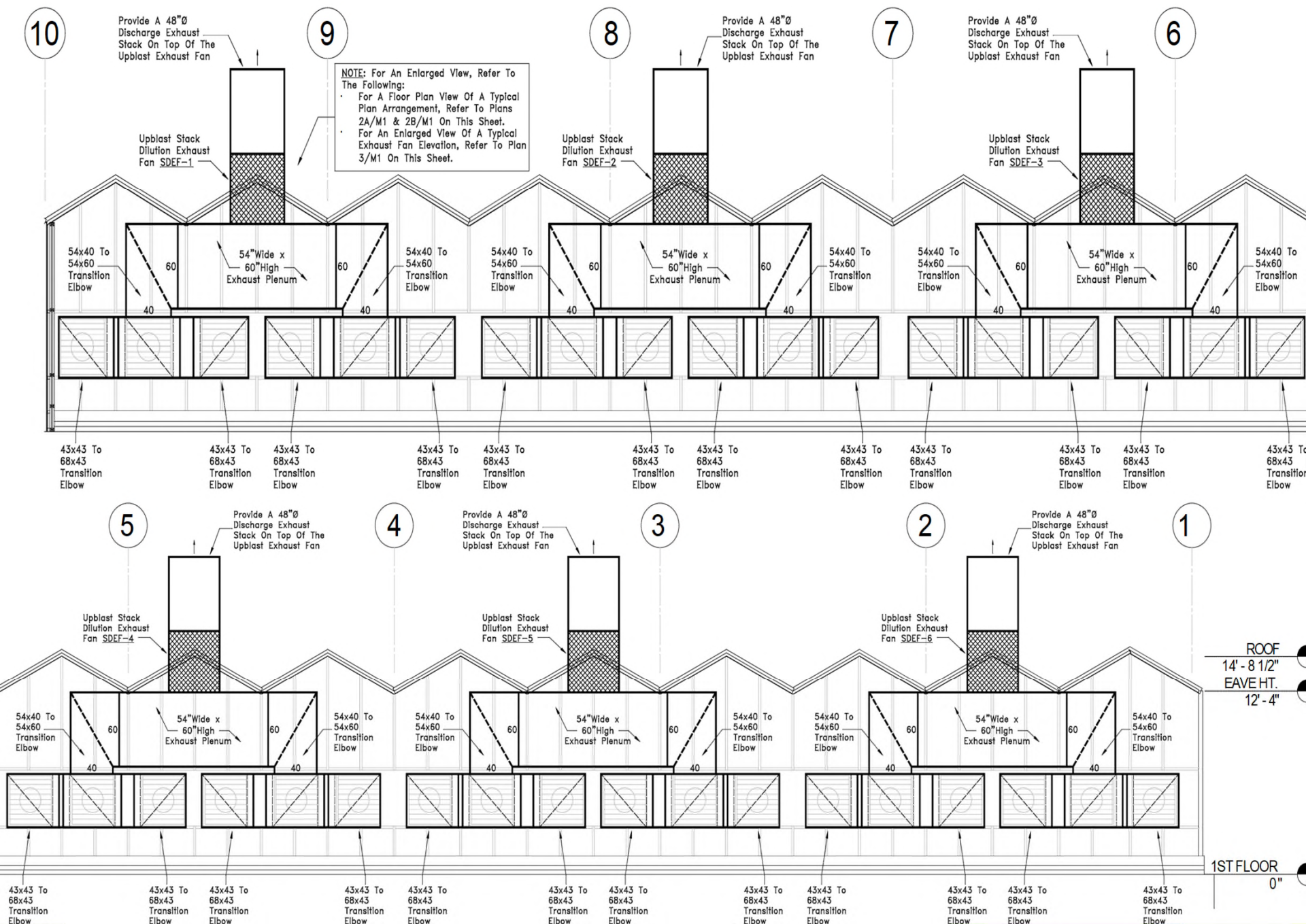


2B
MI

PARTIAL FLOOR PLAN (Upper Section)

SCALE: 1/4" = 1'-0"

TYPICAL FOR (6) LOCATIONS




Ongoing Monitoring & Assessment

- ▶ TerrAscend is committed to conducting ongoing monitoring and assessment of the Odor Mitigation System effectiveness.
- ▶ TerrAscend is currently evaluating environmental engineering and consulting firms to engage for ongoing monitoring of the system, including regularly scheduled olfactory meter readings and other appropriate assessments.
- ▶ TerrAscend expects the monitoring will include regularly-scheduled readings at the 44 survey locations designated during the October 2020 Intermediate Assessment.

Public Outreach & Response


In its commitment to continue serving as good neighbors, TerrAscend developed Public Outreach & Response protocols to enable our neighbors and concerned citizens to directly communicate with TerrAscend.



TerrAscend established a monitored email account at boontontwpneighbors@terrascendnj.com.



Upon receipt of an email, staff will immediately assess the concern, comment or complaint and take appropriate measures to address the issue.



Staff will also complete a Resident Awareness Form, which will include, among other things, key information about the time, location, weather conditions, and nature of concern, comment or complaint.

Public Outreach & Response

A significant advantage to the Public Outreach & Response protocol is the generation of actionable data to implement in TerrAscend's ongoing monitoring and assessment of the Odor Mitigation System.

For example, this data will enable the correlation of complaints with operational activities such as venting or harvesting as well as other factors such as weather conditions.

TerrAscend is dedicated to putting good data to work to continually improve the Multi-Tiered Treatment System and to make operational and other adjustments as warranted.

Public Outreach & Response

Full compliance and cooperation with local and state agencies and our neighbors is a top priority for TerrAscend.

TerrAscend is dedicated to addressing all serious odor concerns in connection with the Greenhouse operations and will utilize all available and feasible technology and operational adjustments to mitigate such odor concerns.

TerrAscend is confident that the odor concerns will be ameliorated once the Greenhouse cultivation operations are discontinued.

Bosarge Environmental <i>Odor assessments and evaluations</i>	\$17,124
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Benzaco Scientific <i>Installation and monthly costs</i>	\$38,785
Installation (\$10,424)	
Installation 14 additional nozzles (\$4,000)	
Total cost to run (\$4,060/month x six months = \$24,361)	

Grow Generation <i>Can Fans</i>	\$16,987
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Carbon Filters for Exhaust Fans \$60 per fan x 36 fans Need to replace every two months. \$2,160 every two months	\$12,960 per year
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Byers Scientific <i>Odor Mitigant</i>	\$11,501
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Febi Contracting <i>Tree removal/berm</i>	\$69,176
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Alfred's Landscape <i>Screening on berm</i>	\$22,124
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Ventilation Stacks <i>Stacks</i>	\$240,000
<i>Electrical</i>	\$69,000

Average Monthly Cost to Run Mitigation System	\$4,060 monthly
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Total Spent on Odor Mitigation (as of February 2021)	\$486,857
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Costs

TerrAscend has invested almost **\$500,000** as of February 2021 to address and mitigate the odor concerns in connection with the Greenhouse operations.



Moving Forward